Chapter 4
Pollution Prevention

Benefits of Pollution Prevention:

- Cost savings by consuming and disposing of less
- Cleaner air and water
- Less solid waste in landfills
- Improved safety
- Reduction in liability
- Reduction in reporting and permitting

A combination of preventative and structural measures are necessary for optimal reduction of stormwater impacts to water bodies. Preventative measures focus on preventing pollutants from getting into stormwater, while structural measures, the topic of Volume III, focus on removing pollutants from stormwater. Once pollutants reach a water body, it is much more difficult and expensive to restore it to its pre-impacted conditions. Therefore, preventative measures are recommended to minimize the degradation of receiving waters using fewer, smaller structural measures, which will also reduce the overall costs of water quality protection.

- Long-Term BMP Maintenance
- Street Sweeping
- Sand and Salt Management
- Fertilizer Management
- Pesticide Management
- Materials Management

These BMPs are not given specific credit for phosphorus removal, but should be considered for inclusion in an overall stormwater management plan.

This section focuses on preventative Best Management Practices (BMPs) intended to minimize or prevent the release of pollutants so they are not available for mobilization by runoff. These BMPs are not given specific credit for phosphorus removal, but should be considered for inclusion in an overall stormwater management plan. The measures described include:

Section Contents:

4.1 Long-Term BMP Maintenance	2
4.2 Street Sweeping	3
4.3 Sand and Salt Management	6
4.4 Fertilizer Management	7
4.5 Pesticide Management	8
4.6 Materials Management	12

4.1 Long-Term BMP Maintenance

Description

Structural BMPs have been used for many years to manage and treat stormwater runoff before it is released to surface waters. These BMPs are designed and sized with a specific performance criteria in mind to remove pollutants such as phosphorus and sediments from stormwater runoff. The maintenance of these systems is crucial for them to continue to perform as designed.

Failure to provide proper maintenance can reduce the pollutant removal efficiency and can impair the hydraulic capacity of the system. Lack of maintenance, especially with regard to vegetative systems or systems that accumulate sediment, can increase rather than decrease the pollutant load of stormwater discharges.

With this in mind, it is important for design engineers to incorporate realistic maintenance goals into BMP designs. For example, sediment removal is a common maintenance practice that is required to prevent infiltration and filter type BMPs from clogging and to prevent water quality storage areas from filling in. If sediments are not removed as needed, the effectiveness of the device will decrease, possibly to the point of failure.

Some devices are also designed with bypasses that allow flows to pass when the system is not maintained to prevent flows from backing up into parking lots and other areas. In these cases, the owner has no physical indication that the device is failing and stormwater runoff flows through the system untreated.

The key to effective maintenance is a combination of realistic maintenance goals, the clear assignment of responsibilities to an established agency (such as local government) or organization (for example, a homeowners association) and a regular schedule of inspections to determine maintenance needs. Maintenance considerations need to begin with the design. Stormwater management system designers should seek to make systems as simple, natural and maintenance-free as possible.

Lack of maintenance at this location has caused the structure to fill up with sediment and other debris. Maintenance is crucial to the overall performance of a BMP. Without it, the BMP is not performing as designed and in some cases can worsen conditions than if no BMP was present

Guidelines

1. **Size BMPs to hold a year's worth of sediment**.

2. **Use the Revised Universal Soil Loss Equation (RUSLE)** to calculate sediment deposits that would occur from pervious areas adjacent to the BMP.

3. **Account for sand deposits from winter storm applications** when designing pre-treatment/sediment removal. Calculate sediment loads using a sand application rate of 500 lbs/acre for sanding of parking areas and access drives, a sand density of 90 lbs/ft^3 and assuming a minimum frequency of ten sandings per year.

To obtain an annual sediment volume, perform the following calculation:

$$\textit{Area to be sanded (acres)} \times 500 \frac{\textit{pounds}}{\textit{acre-storm}} \div 90 \frac{\textit{pounds}}{ft^3} \times 10 \frac{\textit{storms}}{\textit{year}} = \textit{cubic feet of sediment/yr}$$

4. **Design BMPs to alert the owner when it is failing and maintenance is required.** Bypasses should not be used unless there is risk to public health or safety.

5. **The BMP should be easily accessible** to facilitate inspection and maintenance.

6. **Inspections shall be conducted by a person with knowledge of erosion and stormwater control**. General inspection standards are provided in Table 4-1. Actual inspection activities should follow the approved inspection and maintenance plan for the site. The maintenance needs for most vegetative and stabilization measures may be found in the Maine Erosion and Sediment Control BMPs manual as published in, 2003.

7. **Conduct maintenance in accordance with the approved inspection and maintenance plan** for the site. Detailed descriptions of maintenance activities for design purposes can be found in Volume III of this manual for each type of BMP.

References

Comprehensive Environmental Inc. November 2003. *Design Guidelines and Criteria for Stormwater Management.*

4.2 Street Sweeping

Description

Street sweeping involves the removal of grit, debris, and trash from impervious areas such as streets, parking lots, and sidewalks. It is commonly performed to remove trash and sediment buildup from curb gutters to improve aesthetics and reduce the export of sand to structural BMPs and/or to receiving waters. It is most effective at removing coarse particles, leaves, trash, and other similar materials and the pollutants bound to them. If these materials are removed from the paved areas where they are deposited, they are no longer available for transport as a pollutant in stormwater runoff. The specific pollutants generally reduced by street sweeping include sediment, some nutrients, oxygen-demanding substances, and non-biodegradable trash.

The effectiveness of street sweeping will depend on the equipment used and its ability to pick up fine particles. The majority of nutrient, oxygen-demanding and toxic substances reaching the streets is attached to fine particles. Therefore, street cleaning practices that can remove fine particles (less than 246 microns) will be most effective for nonpoint source pollution control. Recent improvements in technology have increased the efficiency of street sweepers, allowing them to pick up more of the fine grained sediment particles, which most of the pollutants are attached to, increasing the benefit to water quality.

New data shows that the newer dry vacuum sweepers can reduce nonpoint pollution by 35–80 percent compared to conventional mechanical broom and vacuum-assisted wet sweeper efficiency of 5–30 percent. Nutrient reduction with the newer dry vacuum sweepers is between 15–40 percent, compared to 0–15 percent with the conventional equipment (Runoff Report, 1998). The new vacuum assisted dry sweeper has also shown a potential reduction in annual sediment loading of 50–88 percent for a residential street, depending on sweeping frequency (Bannerman, 1999).

Other factors will also play a role in the overall effectiveness of street sweeping to remove pollutants from a given area. These include the frequency and location of sweeping and the ability to sweep on heavily traveled roads with on street parking.

Table 4-1 Inspection and Corrective Action for Structural BMPs			
	Inspection Schedule	**What to Look For**	**Corrective Action**
Vegetated Areas	• Annually early in the growing season • After heavy rains	• Active or potential erosion problems	• Replant bare and sparse areas • Armor erosion areas or divert the erosive flows
Ditches. Swales & Open Stormwater Channels	• Spring & late fall • After heavy rains	• Obstructions to flow • Accumulated sediments & debris • Erosion	• Remove obstructions to flow • Remove accumulated sediments & debris • Repair erosion of ditch lining • Repair sloping side slopes • Replace riprap on areas where underlying filter fabric or underdrain gravel is showing
Culverts	• Spring & late fall • After heavy rains	• Obstructions to flow • Accumulated sediments & debis • Erosion at inlet & outlet	• Remove obstructions to flow • Remove accumulated sediments & debris • Repair erosion
Catch Basins	• Annually early spring	• Accumulated sediments & debris • Floating debris & oils	• Remove accumulated sediment and debris • Remove floating debris & oils
Roadways and Parking Surfaces	• Annually early spring	• Accumulated sediments & debris	• Remove accumulated sediment and debris
Resource & Treatment Buffers	• Annually	• Erosion of downslope of spreaders & turn-outs & within the buffer • Concentrating flow • Encroachment by development	• Modify spreader's or turn-out's lip for better distibution of flow into buffer • Repair erosion • Clean out accumulated sediment within spreader bays or turn-out pools
Stormwater Detention Retention Areas	• Annually in fall • After heavy rains	• Obstructions to flow • Settlement and erosion of embankment • Damage to piping • Downstream swamping • Broken seals, obstructed orifices & plugged trash racks at the outlet structure • Accumulated sediment & debris	• Remove obstuctions to flow • Remove accumulated sediment & debris every 2-5 years • Repair eroded areas • Repair damage to trash racks or debris gurards • Mow to control woody vegetation • Replace riprap where underlying filter fabric, soil or underdrain filter is showing
Runoff Infiltration Facilities	• Spring & late fall	• Accumulated sediment & debris • Drainage within 72 hours	• Remove sediment & oils in pretreatment spring & late fall • Remove sediments in infiltration area every 2-5 years • Till & replant soil of vegetated basins every 2-5 years • Reconstruct rock basins or trenches by removing stones, replacing underlying filter fabric, & tilling underlying soil
Proprietary Treatment Devices	• Early spring & late fall	• Accumulated sediments, oils & debris	• Remove accumulated sediment, oil & debris

The following describes some of the most common street sweeping equipment used:

a. *Mechanical sweepers:* Mechanical sweepers basically consist of a gutter broom and a main broom which rotate at high speeds, forcing the debris from the street surface into a conveyer belt and subsequently into a hopper. Water is usually sprayed on the pavement surface for dust control.

The effectiveness of mechanical sweepers is recognized to be a function of a number of factors, including; (1) particle size distribution of accumulated surface contaminants; (2) sweeping frequency; (3) number of passes; (4) equipment speed; and (5) pavement conditions.

b. *Vacuum Sweepers:* These sweepers feature vacuum action over the entire path, assisted by a gutter broom. Regenerative air sweepers force air down onto the pavement, suspending particles, which are then picked up by the vacuum suction. Some types of vacuum sweepers can serve another municipal maintenance function. If the unit is equipped with a wandering hose attachment, it can be used for sewer and catch basin cleaning.

Guidelines

The majority of particulate contaminants which are deposited on streets are blown to the side by moving vehicles. An estimated 90% of street contaminants accumulate within 12 inches of the curbline of guttered streets (citation). Street cleaning operations should concentrate in cleaning curb and gutter lines for maximum pollutant removal efficiency. Other areas can also be swept periodically, probably on a less regular basis. Sweeping should be conducted immediately following spring snowmelt to remove sand and other debris. Pavement surfaces may be swept at other times, basically for aesthetic reasons, such as in the fall after leaves have dropped to remove accumulated debris.

Street sweepers such as this one remove sediment buildup on roadways, reducing the amount of sand that is deposited in catch basins and other structures, and ultimately into the receiving water.

References

Bannerman, R. 1999. Sweeping Water Clean. *American Sweeper Magazine*, Huntsville, AL. Volume 7, Number 1.

MPCA. 1989. *Protecting Water Quality in Urban Areas: Best Management Practices for Minnesota.* Minnesota Pollution Control Agency, Division of Water Quality, St. Paul, Minnesota.

EPA. 1983. *Results of the Nationwide Urban Runoff Program. Volume I — Final Report*. U.S. Environmental Protection Agency, Water Planning Division, Washington, D.C. NTIS Accession number PB 84-185552.

Pollution Prevention/Good Housekeeping for Municipal Operations, Parking Lot and Street Cleaning. (August 15, 2002). Retrieved March 29, 2005 from the World Wide Web: URL: http://cfpub.epa.gov/npdes/stormwater/menuofbmps/poll_10.cfm

A Clean Sweep Now Possible. Runoff Report. The Terrene Institute, Alexandria, VA. Vol. 6 No. 4, July/August 1998.

4.3 Sand and Salt Management

Description

Sand and salt is commonly used on roads during cold winters to make travel safer. The salt reduces the melting point of ice to prevent ice buildup, while the sand increases traction on the road. The two products are often combined and applied as a sand/salt mix.

Salt is very soluble in water. Contact with stormwater causes salt to dissolve into the water, allowing it to migrate into groundwater and surface water resources, where excessive salt levels contaminate these resources. Salt runoff and wind-carried spray may damage or kill plants and trees. Corrosion damage to motor vehicles is another side effect of salt use.

The proper application and storage of salt and sand/salt can minimize the negative impacts associated with its use and storage. Close control of salt spreading to avoid excessive application will not only save maintenance funds but will also minimize these harmful side effects. It may also be desirable to use ditching and storm drains to alter present runoff patterns to reduce contamination of wells and roadside vegetation. If this water can flow directly and quickly to reasonably sized streams or rivers, this damage can be minimized.

The proper storage of salt and sand/salt piles can minimize the impacts associated with bulk storage, which is responsible for many of the problems associated with contamination of local waterways. That is why the Maine Legislature enacted the storage facility program in 1987.

This salt pile is appropriately stored within a covered salt storage shed. Proper storage of salt under cover is essential to minimize leaching of salt into ground and surface waters. It also eliminates the loss of salt to precipitation and keeps it in a form that is easy to work with.

Because shallow wells, and maybe deep wells, can be polluted by salt, it is possible that a municipality could face unexpected expenses in providing fresh water or drilling new wells for certain buildings. A municipality should be aware of State law Title 23 MRSA 3659 on the "protection of private water supplies". This law details the procedure for handling well damage claims.

Guidelines

1. **Salt and Sand/Salt Storage**:
   a. All new sand/salt storage areas greater than or equal to 100 cubic yards of mixed sand/salt **must be registered** with the Maine Department of Environmental Protection and follow Chapter 574, "Siting and Operation of Road Salt and Sand-Salt Storage Areas."

2. **Handling and Application**:
   a. **Use sand/salt spreaders that are capable of adjusting application rates and routinely calibrate** to achieve an optimal application rate according to roadway characteristics (e.g., width and design).

   b. **Train existing and new employees** for effective application of deicing materials.

   c. **Use weather and roadway monitoring systems** to adjust de-icing activities to changing conditions and minimize road

way pretreatment techniques (e.g., salting prior to storms).

d. **Use ice-cutting plow blades** to reduce the need and/or volume of de-icing materials.

e. **Implement salt use restrictions around key water bodies**.

f. **Sweep sand/salt that spills during loading operations**.

References

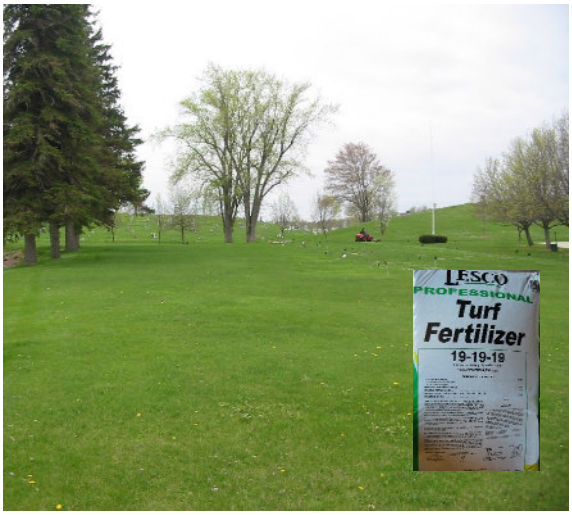
Pollution Prevention/Good Housekeeping for Municipal Operations, Road Salt Application and Storage. (August 15, 2002). Retrieved May 13, 2005 from the World Wide Web: URL: http://cfpub.epa.gov/npdes/stormwater/menuof-bmps/poll_12.cfm

Storm Water Management Fact Sheet, Minimizing Effects from Highway Deicing. (September 1999). Retrieved May 13, 2005 from the World Wide Web: URL: http://www.epa.gov/owm/mtb/ice.pdf

4.4 Fertilizer Management

Description

Fertilizers are a source of nutrients, particularly nitrogen and phosphorus, used to promote the growth and health of vegetation. They are used extensively in urban areas on parks, cemeteries, plant nurseries, roadsides and medians, golf courses, institutions, businesses and industrial establishments, and individual home lawns and gardens. The misapplication of fertilizers can result in discharge of these nutrients to water courses. Excess nitrogen can increase nitrate levels in groundwater, making water harmful for infants to drink. Excess phosphorus in lakes can deplete the amount of oxygen, stimulate algal growth, and even cause fish kills. These conditions require drastic measures to correct. The proper management of fertilizer, including the control of fertilizer application rate, prevention of over-spray to impervious surfaces, and method and timing are important to prevent these negative impacts.



Fertilizers are commonly used by businesses and residents to promote lush green lawns and attractive vegetation. They are often used in greater quantities than needed causing excess nutrients to be washed away with stormwater into groundwater and surface waters. Excess nitrogen easily passes through soils to groundwater, making water harmful for infants to drink. Excess phosphorus in lakes can cause algal blooms and even fish kills from depleted oxygen levels. The proper management of fertilizer is important to prevent these negative impacts.

Personnel involved with commercial and industrial application of fertilizer are routinely concerned with the costs of such application and may be less likely than homeowners to use excess fertilizer or fertilize at unfavorable times. Residential homeowners, however, may apply fertilizer in the wrong weather (i.e., before heavy rains) or season and are known to use far more fertilizer (and pesticides) on lawns and gardens than they need. Since built-up residential areas border streets and drainage ways that can transport pollutants quickly to waterways, misuse or over-application of fertilizer in residential areas and wash-off of the excess can cumulatively register a significant adverse impact on water quality. Test your soil to determine fertilizer needs.

Guidelines

1. **Follow landscape design standards** at new development sites. Proper landscape design using adequate topsoil and vegetation will minimize long-term maintenance practices. Landscape design standards are included in Appendix I-B.

2. **Protect soils from erosion** during vegetative establishment. Soil enriched with fertilizer nutrients can be easily eroded and carried away in runoff if adequate soil stabilization techniques are not used. Applicable erosion control measures are referenced in the Maine Erosion and Sediment Control BMP Manual (2003).

3. **Test soils** to avoid over-application of unnecessary nutrients, especially for new lawns. Cooperative Extension Service specialists advocate a repeat test at least every three years. For instance, a soil may need nitrogen (N) but need little phosphorus (P) or potassium (K), yet in absence of a test, a fertilizer high in all three nutrients may be applied. Do not use phosphorus fertilizer for projects in lake watersheds. It has been found that in Maine, phosphorus is sufficiently present in the soil to allow for plant growth, yet phosphorous is a pollutant for lake waters.

4. **Use granular fertilizers** that allow for slow release of nutrients. The granular form is less apt to wash away than sprays or slurries. However, lawn maintenance companies may use liquid applications that are resistant to runoff when applied correctly. When used in gardens, granular fertilizer should be worked into the soil, which should be moist at the time of application.

5. **Use organic fertilizers** (compost, manures, etc.) where possible. These are less soluble than formulated chemical fertilizers. However, care must be taken to prevent these from eroding into water courses.

6. **Apply fertilizer to moist soils** when there is little likelihood of an immediate heavy rain. Lightly sprinkle the fertilized area after application. Applying fertilizer immediately before a predicted rainfall in an attempt to aid in soluble delivery to plants results in the loss of much of the fertilizer in runoff.

7. **Never apply fertilizer to frozen ground**. The vegetation and soils cannot absorb the fertilizer under these conditions and will result in the runoff of fertilizers.

References

NPS Agricultural Task Force. 1991. *State of Maine Strategy for Managing Nonpoint Source Pollution from Agricultural Sources and Best Management System Guidelines.* Maine Department of Environmental Protection. Augusta, Maine.

University of Maine Cooperative Extension Service. 1989. *Best Management Practices for Maine Agricultural Producers.* University of Maine Cooperative Extension Service. Orono, Maine.

4.5 Pesticide Management

Description

The term “pesticides” is construed broadly to cover chemicals used against pests of all kinds: insecticides to kill insects; herbicides to kill weeds, brush or other unwanted vegetation; fungicides to control fungi that cause molds, rots, and plant and animal disease; and rodenticides to kill rats and other rodents. Pesticides are used throughout urban areas on grounds of institutions, business and industrial establishments; rights-of-way of roads, power lines, pipelines and railroads; construction projects; parks, recreation areas, plant nurseries, fairgrounds, zoos, cemeteries, waterbodies, woods and other “green” areas; dumps and landfills; and home lawns and gardens. Pesticide management involves eliminating excessive pesticide use, employment of proper application procedures, and the use of alternatives to chemical pest control to reduce the pesticide load in stormwater runoff.

Pesticides are poisons. They may be characterized by acute toxicity, or they may cause long-term chronic effects via the food chain. Persistent pesticides may pass unchanged through conventional waste treatment plants, and large amounts of some of these can kill the bacteria that are essential to break down other wastes in the treatment process.

Due to the great variety of uses of pesticides, the collective amount reaching watercourses in runoff from urban areas is significant. Pesticides vary widely in toxicity and persistence. However, since all are intended to kill something, caution in their use is always essential.

Pesticides are regulated by several federal and state agencies, operating under a variety of statutes. The most significant federal statute is the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), which has been amended several times since its enactment in 1947. The United States Environmental Protection Agency (EPA) currently administers FIFRA.

FIFRA emphasizes pesticide registration and labeling requirements as the means to ensure that pesticides, used according to label instructions, will be safe. EPA must approve all pesticide labels, and user compliance with the label requirements is mandated: "The label is the law."

In Maine, the "Maine Pesticide Control Act of 1975" (7 MRSA Section 601) requires the registration of pesticides legally distributed in the state. The "Maine Board of Pesticides Control" (22 MRSA Section 1471) provides for the certification and licensing of sellers and applicators.

Pesticides are poisons. Although they vary in toxicity and persistence, they all have the same common purpose, to kill something. Care should be used in selecting and applying a pesticide to minimize the amount of pesticides collected by stormwater runoff.

Guidelines

1. **Pesticide Selection:**
   a. **Use the least toxic chemical** that will accomplish the purpose.

   b. **Use organic pesticides in lieu of or in combination with chemical pesticides**. A wide variety of organic pesticides, pro duced from plants, bacteria, and other nat urally occurring substances are available in quantities for both commercial and res idential use. These substances usually present much less risk for contamination of groundwater and surface water, and much fewer problems for disposal of left over product or containers. Beneficial insects are also available in bulk or amounts suitable for residential use, and can be used alone or in combination with other pesticides to eliminate or minimize the use of toxic substances.

   c. **Use pesticides that degrade rapidly** since they are less apt to become water pollutants.

   d. **Use pesticides with low solubility** since they are less apt to cause water pollution through drainage and runoff. Loss of such chemicals can be greatly reduced by preventing erosion.

2. **Application:**

a. **Follow the manufacturer's instruc tions on the label**. Never exceed the manufacturer's dosage recommendations. The label message includes the target point for application on plant or soil; the recommended application times (early morning or late evening, when tempera tures are down and the air is still); safety advice, and referrals to Extension Service guidance. Consult the experts.

b. U**se granular forms** over liquids because application losses are lower.

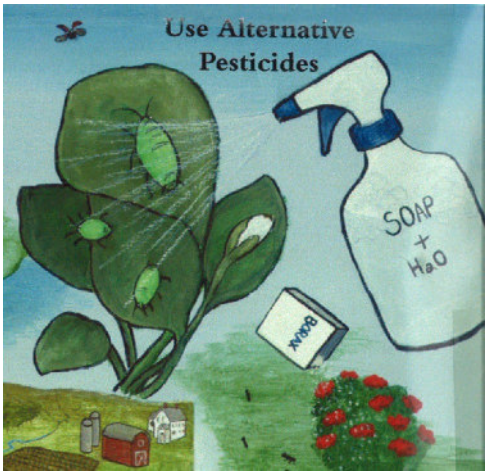
c. **Apply pesticides in a narrow band** rather than wide band; do not broadcast them over an entire lawn area. **Spot-spray infested areas** rather than apply ing excess amounts of pesticides as insurance against pests. **Never apply over impervious surfaces**; this precau tion especially applies to water sprays.

d. **Spray pesticides only when wind speeds are less than 7 mph**. Spray in the early morning or at dusk when wind speeds are usually at their lowest. Air temperature should range between 40 - 80 degrees F.

e. **Apply dust formulations during the early morning or late evening hours** when there is little or no air movement. These are highly susceptible to wind drift, not only when being applied but also after they reach their target.

f. **Apply spray formulations during period of low air movement**. Large droplets fall faster and are less likely to contaminate non-target areas. Ground sprays followed by soil incorporation are not likely to be a source of water pollu tion unless excessive erosion occurs.

g. **Apply granular formulation to moist soils** when there is little likelihood of an immediate heavy rain. Lightly sprinkle the applied area after application. Applying pesticides immediately before a predicted rainfall results in the loss of much of the pesticide in runoff. Loss of granular formulations can be controlled for the most part with adequate soil conservation practices.



There are many substitutes available for pesticides that will accomplish the same goal. These should be used before resorting to pesticides to minimize the potential impacts to surface water and groundwaters.

h. **Contain fumigant forms of pesticides** after application through the use of soil compaction, water seal, and sealing of the area with a plastic cover. These must be kept in place for specific lengths of time in order to be effective. Most fumigants act rapidly and degrade quickly. Consequently, water pollution is usually not a problem.

i. **Professional applicators must be certified**. Golf course superintendents, nursery and tree maintenance personnel, some industrial and institutional employees, and certain municipal employees will also need state certifica tion.

j. **Keep up with available pesticide chemicals and application methods**. New and more effective pesticides are continually being introduced. Occasional,

products are banned when unanticipated detrimental effects or hazards emerge. Therefore, commercial applicators must keep current with available pesticide chemicals and application methods. Owners or operators of facilities requir ing the services of applicators should ensure that their own employees with direct responsibility in this field keep informed.

3. **Disposal:**

a. **Limit purchases to a one-year or one-season supply**. This will prevent the accumulation of materials and minimize disposal problems associated with unused materials.

b. **Consult with Maine DEP Remediation and Waste Management for the disposal of pesticides**. Disposal of pesticides should be minimized by using small quantities for the purpose intended in accordance with product label directions until supplies are exhausted. Undamaged, unopened containers should be returned, if feasible, to the dealer or manufacturer. They should never be burned in built-up areas. Herbicide containers must never be burned. Certain other pesticides also carry a "No Burning" label.

4. **Storage:**

a. **Store pesticides in accordance with manufacturer's recommendations**. Pesticides should not be stored longer than the maximum time recommended by the manufacturer, as leakage may develop. Storage facilities should:

- **provide adequate protection** against excessive heat, cold and moisture.
- **not be subject to flooding**.
- **prevent contaminated runoff** if leakage should occur.
- **provide for security** to prevent non-qualified individuals from dispensing the chemicals.
- **Avoid storage of pesticides in pump houses** or other buildings adjacent or in close proximity to streams, ponds, lakes, canals, or wells.
- **Do not mix pesticides or fill, empty, or repair application equipment** where spilled pesticides could drain or be washed into stream, ponds, canals, or other bodies of water.
- **Construct aprons and sumps** at com mercial loading sites to catch any over flow and spills.
- **Install check valves** on all intake hoses to prevent back-siphoning from sprayer tanks, particularly if the same pump is used for both filling and spraying.
- **Suspend the filler hose** so as to provide an air space between the hose and the surface of the spray mix in a full tank to prevent back-siphoning.
- **The operator must stay with the sprayer while filling**.

Pesticides must be labeled and stored properly to minimize leaks and misuse. Purchases should be limited to the quantity needed for a season or year to minimize disposal problems of unused materials.

b. **Surface Waters**: If water is withdrawn from a natural water body for mixing or cleanup, withdraw with a pumping sys tem separate from that of the pesticide application equipment. Do not drive equipment into a stream or lake for fill ing and cleaning. Flush equipment only in an area where dumping and rinse water can be properly treated and dis posed. If the equipment must be filled at

the stream or lake, place only a suction on line in the water. Equipment should never be emptied or cleaned adjacent to (within 100 feet of) or in a water body.

c. **Groundwaters**. Do not place toxic chemicals on the soil where there is a danger of contaminating subsurface water through percolation or through rock fissures. Contaminated groundwater could be spread to many homes through a water distribution system which has a well drawing contaminated water as its supply. Use backflow pre vention devices on all hose connections used in the vicinity of chemical mixing and filling operations for additional pro tection. Pits used for dumping flush water should have impermeable linings to avoid groundwater and soil contami nation. The pits should be designed specifically for this purpose, and should comply with applicable standards for handling and disposal of pesticides.

d. **Piped Water Supplies**. There is a risk of siphoning that can be created by other users drawing water concurrently with filling or flushing operations. Equip all hose connections with backflow preven tion devices.

Technical advice on pesticide use is available throughout the state from local agents of the Cooperative Extension Service operating through the University of Maine. Contact the Maine Organic Farmers and Gardeners Association (MOFGA, P.O. Box 170, Unity, ME 04988) for information on minimizing pesticide and herbicide application, and cost-effective alternatives to pesticide and herbicide use.

References

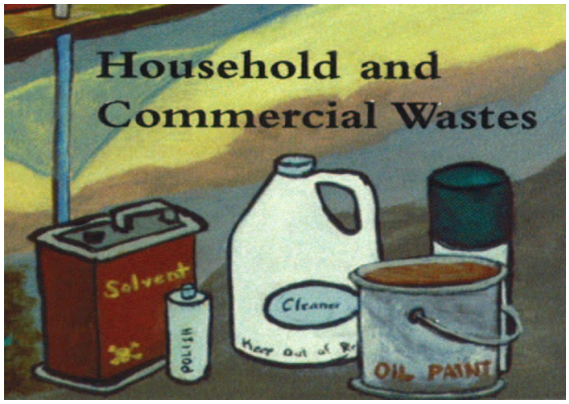
NPS Agricultural Task Force. 1991. *State of Maine Strategy for Managing Nonpoint Source Pollution from Agricultural Sources and Best Management System Guidelines*. Maine Department of Environmental Protection. Augusta, Maine.

University of Maine Cooperative *Extension Service. 1989. Best Management Practices for Maine Agricultural Producers*. University of Maine Cooperative Extension Service. Orono, Maine.

4.6 Materials Management

Description

Chemicals such as solvents, paints, cleaners and petroleum products are used extensively today by both residents and businesses for multiple purposes (i.e., home and building maintenance, auto maintenance). Many products, even common household products (i.e., moth balls, drain & oven cleaners, and motor oil) contain toxic ingredients. When released to the environment, toxics and hazardous substances may accumulate in sediment, posing risks to bottom feeding organisms and their predators. They also contaminate ground and surface drinking water supplies. Some contaminants can



Many commonly used products contain toxic ingredients (i.e., paint thinners, moth balls, drain and oven cleaners, motor oil, lubricants), requiring careful management and disposal. If released to the environment, toxics and hazardous substances can contaminate ground and surface waters, harming fish and other organisms, including humans.

bioaccumulate in tissues of fish and other organisms, including humans.

The proper management of these materials is essential to prevent their release to the environment and contact with stormwater. Materials management includes selection, use, storage and disposal of products.

Guidelines

1. **Product Selection**: **Use natural and less toxic alternatives whenever possible**.

2. **Product Storage**:
   a. **Clearly label all containers with contents**.

   b. **Store chemicals in rugged, sealable, spill-resistant containers.**

   c. **Leave sufficient aisle space** to inspect materials and ease transport.

   d. **Store away from high traffic areas**. This reduces the possibility of spills associated with accidents.

   e. **Store on pallets** to avoid contact with moisture on floors, which can promote corrosion containers. This eases inspec tion of containers for leaks.

   f. **Keep materials covered** to reduce contact with stormwater and wind. This includes everyday storage, as well as handling operations.

3. **Product Use:**
   a. **Follow chemical directions** on the packaging.

   b. **Don't over-use chemicals**.

4. **Product Disposal**:
   a. **Never pour any substance, particularly hazardous or toxic products, down a storm drain inlet.** They flow directly to our lakes and streams.

This is an example of good storage practices for hazardous materials. Hazardous materials should be stored in their original containers off of the floor or ground. All containers should be labeled and covered. A storage cabinet is an excellent option for storing materials in a safe and convenient manner.

   b. **Never pour hazardous or toxic products down a drain or toilet**.

   c. **Never dump hazardous or toxic products on the ground.**

   d. **Do not discard hazardous or toxic products with regular household trash**.

   e. **Recycle used motor oil** by taking it to a service station or local recycling center.

   f. **Do not mix with incompatible products**. This can cause reactions and release toxic fumes. Mixing of products could also pre vent a product from being recycled, increasing disposal costs.

   g. **Residents take unused hazardous chemicals to annual Household Hazardous Waste Collection Days.**

Unused hazardous materials or waste must be disposed of at a licensed facility. Many communities offer annual household hazardous waste days to residents, allowing residents to drop off any hazardous materials they need to dispose of. Hazardous materials should never be dumped down toilets or drains, storm drains, onto the ground, or thrown away with regular household trash. Disposal in this manner has the potential to contaminate surface waters and groundwaters.

5. **Vehicle Maintenance**:
   a. **Wash vehicles on the lawn or a car wash facility** instead of a paved surface. Washing a vehicle on a paved surface can flush detergents and other contaminants into the storm drain system and directly into streams, lakes and wetlands. Washing on a lawn or other pervious surface allows the wash water to filter through soils and vegetation, which help remove contaminants.

   b. **Keep automobiles well-tuned** to prevent toxic fluids from dripping and toxic fumes from emitting.

   c. **Dispose of used auto fluids and batteries at designated drop-off and recycling locations**.

   d. **Avoid spilling gas and oil on the ground or in the water**.

   e. **Immediately clean any spills on the ground.**

   f. **Don't top off fuel tanks**.

6. **Spill Response**:
   a. **Use as little water as possible to clean spills, leaks and drips**.

   b. **Keep absorbent materials such as kitty litter or speedy dry nearby** to contain spills and prevent them from entering drains.

   c. **Industrial facilities should consider developing a spill response plan** if not otherwise required. The plan should out line personnel responsible for implement ing the plan; the types, quantities and locations of wastes, as well as their associated hazards; measures to prevent spills; and what to do in the event of a spill (i.e., who to call, how to contain it).

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